

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-21 (Canceled).

22. (New) An infusion control device for controlling infusion of a liquid in an extracorporeal blood circuit, comprising:

an arterial pipe connected to an inlet of a blood compartment of a filter, the arterial pipe being also connected to a pre-dilution pipe of an infusion circuit;

a venous pipe connected to an outlet of the blood compartment, the venous pipe being also connected to a post-dilution pipe of said infusion circuit; and

a control unit configured to regulate and distribute an infusion flow rate in said arterial and venous pipes based on a monitoring of quantities that are directly correlated with the operating conditions of the filter.

23. (New) Device according to claim 22, wherein said quantities are obtained by mathematical methods from measured or imposed quantities.

24. (New) Device according to claim 22, wherein said quantities comprise trans-membrane pressure values.

25. (New) Device according to claim 24, wherein said trans-membrane pressure values include mean trans-membrane values:

$$TMP_{ave} = [TMP_i - TMP_o] / 2$$

calculated from four pressures measured at the inlet and outlet of the blood compartment and at the inlet and outlet of a dialysis liquid compartment of the filter, wherein, TMP_i is the inlet transmembrane pressure value, which is equal to the difference between the pressure value at the inlet of the blood compartment and the pressure value at the outlet of the dialysis liquid compartment, and TMP_o is the outlet transmembrane pressure value, which is equal to the difference between the pressure value at the outlet of the blood compartment and the pressure value at the inlet of the dialysis liquid compartment.

26. (New) Device according to claim 25, further comprising:

means for measuring the blood pressure values at the inlet and at the outlet of the blood compartment of the filter;

means for measuring the dialysis liquid pressure values at the inlet and at the outlet of the dialysis liquid compartment of the filter;

means for calculating an inlet transmembrane pressure value as the difference between the pressure value at the inlet of the blood compartment and the pressure value at the outlet of the dialysis liquid compartment and an outlet transmembrane pressure value as the difference between the pressure value at the

outlet of the blood compartment and the pressure value at the inlet of the dialysis liquid compartment; and

means for calculating mean transmembrane pressure value equal to $(TMP_i - TMP_o) / 2$.

27. (New) Device according to claim 22, wherein said quantities comprise quantities that are correlated with the concentration of the blood.

28. (New) Device according to claim 22, wherein said quantities comprise filtration factors determined on the basis of:

$$FF = UFR/Q_p = UFR / [Q_b \cdot (1-Hct)]$$

in which UFR is the ultrafiltration flow rate, Q_p is the plasma flow, Q_b is the blood flow, and Hct is the hematocrit.

29. (New) Device according to claim 28, further comprising:

means for determining an ultrafiltration flow rate of plasma water through the membrane of the filter;

means for determining the hematocrit at the inlet of the filter, and

means for calculating a filtration factor equal to $UFR / [Q_b(1-Hct)]$.

30. (New) Device according to claim 29, wherein the means for determining the hematocrit comprise means for determining the hemoglobin concentration at the inlet of the filter and means for dividing the hemoglobin concentration by a constant coefficient.

31. (New) Device according to claim 22, wherein said quantities comprise an actual permeability of a membrane of the filter.

32. (New) Device according to claim 31, further comprising:

means for determining an ultrafiltration flow rate of plasma water through the membrane of the filter; and

means for calculating an actual permeability equal to the ratio between the ultrafiltration flow rate and the mean transmembrane pressure value.

33. (New) An infusion control device for controlling infusion of a liquid in an extracorporeal blood circuit, comprising:

an arterial pipe connected to an inlet of a blood compartment of a filter, the arterial pipe being also connected to a pre-dilution pipe of an infusion circuit;

a venous pipe connected to an outlet of the blood compartment, the venous pipe being also connected to a post-dilution pipe of said infusion circuit; and

a controller configured to regulate the flow rates in said two pipes from at least one quantity correlated with the concentration of the blood and/or with the filtration efficiency of the filter.

34. (New) Device according to claim 33, further comprising a valve means for alternately occluding the pre-dilution pipe and the post-dilution pipe.

35. (New) Device according to claim 33, further comprising at least one infusion pump for circulating an infusion liquid in said pre-dilution and post-dilution pipes.

36. (New) Device according to claim 33, wherein said at least one quantity comprises at least one selected in the group including:

a filtration factor determined on the basis of:

$$FF = UFR/Q_p = UFR / [Q_b \cdot (1-Hct)]$$

in which UFR is the ultrafiltration flow rate, QP is the plasma flow, Qb is the blood flow and Hct is the hematocrit,

an actual permeability of a membrane of the filter, and

a trans-membrane pressure of a membrane of the filter.

37. (New) Device according to claim 36, further comprising:

means for measuring the blood pressure values at the inlet and at the outlet of the blood compartment of the filter;

means for measuring the dialysis liquid pressure values at the inlet and at the outlet of a dialysis liquid compartment of the filter;

means for calculating an inlet transmembrane pressure value as the difference between the pressure value at the inlet of the blood compartment and the pressure value at the outlet of the dialysis liquid compartment, and an outlet transmembrane pressure value as the difference between the pressure value at the

outlet of the blood compartment and the pressure value at the inlet of the dialysis liquid compartment; and

means for calculating a transmembrane pressure value equal to $(TMP_i - TMP_o) / 2$.

38. (New) Device according to claim 36, further comprising:

means for determining an ultrafiltration flow rate of plasma water through the membrane of the filter;

means for determining the hematocrit at the inlet of the filter; and

means for calculating a filtration factor.

39. (New) Device according to claim 38, wherein the means for determining the hematocrit comprises means for determining the hemoglobin concentration at the inlet of the filter and means for dividing the hemoglobin concentration by a constant coefficient.

40. (New) Device according to claim 36, further comprising:

means for determining an ultrafiltration flow rate of plasma water through the membrane of the filter; and

means for calculating an actual permeability equal to the ratio between the ultrafiltration flow rate and the mean transmembrane pressure value.

41. (New) An infusion control device for controlling infusion of a liquid in an extracorporeal blood circuit, comprising:

an arterial pipe connected to an inlet of a blood compartment of a filter, the arterial pipe being also connected to a pre-dilution pipe of an infusion circuit;

a venous pipe connected to an outlet of the blood compartment, the venous pipe being also connected to a post-dilution pipe of said infusion circuit;

sensors able to emit signals correlated to at least one quantity correlated with the concentration of the blood and/or with the filtration efficiency of the filter; and

a control unit able to receive said signals and to regulate the infusion flow rates in the pre-dilution pipe and in the post-dilution pipe on the basis of said signals.

42. (New) Device according to claim 41, wherein said sensors are selected from the group including: haemoconcentration sensors, blood viscosity measuring devices, blood electrical conductivity measuring devices, blood density measuring devices, blood pressure sensors, and dialysis liquid pressure sensors.

43. (New) Blood treatment machine comprising an infusion control device according to claim 22.

44. (New) Blood treatment machine comprising an infusion control device according to claim 33.

45. (New) Blood treatment machine comprising an infusion control device according to claim 41.

46. (New) Method for infusing a liquid in an extracorporeal blood circuit, the extracorporeal blood circuit having an arterial pipe connected to an inlet of a blood

compartment of a filter and a venous pipe connected to an outlet of the blood compartment, the method comprising:

determining the infusion flow rates of the liquid to infuse in the arterial pipe and in the venous pipe from at least one quantity correlated with the concentration of the blood and/or with a filtration efficiency of the filter, and

infusing the liquid in the arterial pipe and in the venous pipe in accordance with the determined infusion flow rates.

47. (New) Method according to claim 46, wherein said quantity comprises at least one of:

a filtration factor determined on the basis of:

$$FF = UFR/Q_p = UFR / [Q_b \cdot (1-Hct)]$$

in which UFR is the ultrafiltration flow rate, Q_p is the plasma flow, Q_b is the blood flow, and Hct is the hematocrit,

an actual permeability of a membrane of the filter, and

a trans-membrane pressure of a membrane of the filter.

48. (New) Method according to claim 46, wherein the concentration of the blood is measured directly, via the hematocrit Hct.

49. (New) Method according to claim 46, wherein the concentration of the blood is measured indirectly by measuring the hemoglobin, or by measuring the blood

viscosity, or by measuring the blood electrical conductivity, or by measuring the blood density.